104

GLOBAL INFORMATION INFRASTRUCTURE: THE NEXT STEPS—U.S. INDUSTRY PERSPECTIVES

Y 4. IN 8/16: IN 3/2

Global Information Infrastructure:...

HEARING

BEFORE THE

SUBCOMMITTEE ON
INTERNATIONAL ECONOMIC POLICY AND TRADE

OF THE

COMMITTEE ON
INTERNATIONAL RELATIONS
HOUSE OF REPRESENTATIVES

ONE HUNDRED FOURTH CONGRESS

FIRST SESSION

MARCH 14, 1995

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GLOBAL INFORMATION INFRASTRUCTURE: THE NEXT STEPS—U.S. INDUSTRY PERSPECTIVES

TUESDAY, MARCH 14, 1995

HOUSE OF REPRESENTATIVES,
COMMITTEE ON INTERNATIONAL RELATIONS,
SUBCOMMITTEE ON INTERNATIONAL
ECONOMIC POLICY AND TRADE,
Washington, DC.

The subcommittee met, pursuant to call, at 2 p.m. in room 2172, Rayburn House Office Building, Hon. Toby Roth (chairman of the subcommittee) presiding.

Mr. ROTH. In this committee we want a reputation for starting on time so the members know that if we have a meeting at 2 o'clock, it does not mean 2:15 or 2:30. So I think we will begin now.

For 30 years, we have listened to futurists, theoreticians and science fiction writers describe the new information age brought about by linking computers and communications. We have been told the coming information age would transform the world of work, would generate new industries and doom old ones and would turn our planet into a proverbial global village.

Well, that vision is no longer somewhere in the future. It is happening now.

At the G–7 Conference 2 weeks ago on the Global Information Society, it was estimated that the world market for information systems and services is already more than $1 trillion a year.

As communications become computerized, we are seeing the convergence of computers, telecommunications, broadcasting and all the supporting specialized technologies into one new mega-industry: The Global Information Infrastructure.

The world is literally being rewired to handle the new digital signals that will carry voice, data and video all in one system. The Internet is merely the first step, not the last in this network.

Soon, the Internet as we know it will be obsolete, dwarfed by later generations of technology.

Who is going to build this equipment?

Who will collect tolls to the global system?

Currently, U.S. companies have one-third of the world market. But the race is on—from Europe, from Asia, and from the U.S.—to capture the new demand for equipment and services which is growing at about 10 percent a year.

What will it take for the United States to maintain its lead?

In other words, how do we implement the goals that were set out in Brussels 2 weeks ago?

That is the issue of this hearing. To provide answers, we have two national experts with us today. And I know from sitting in the cloakroom, we have a great many Congressmen talking about this issue. People are very much concerned and interested in it.

Today, our votes begin at 5:00 so we have members coming back to D.C. But the people who are not able to hear our witnesses say it is their great loss because we have two wonderful witnesses. One is Rick LeFaivre. It is nice to have you with us today from Apple Computers, representing the Information Technology Industry. And Ralph Harnett of Raychem Corporation, representing the American Electronics Association.

Gentlemen, it is wonderful to have both of you with us today and without objection we are going to include into the record the opening statements so that you can speak freely, as you would like, or give us your entire testimony. And I think with that, we will call on Mr. LeFaivre.

STATEMENT OF RICHARD A. LeFAIVRE, VICE PRESIDENT, ADVANCED TECHNOLOGY, APPLE COMPUTER, INC.

Mr. LeFaivre. Thank you, Mr. Chairman. On a personal note, you should know that I am a graduate of Wisconsin. Twenty years ago I got my Ph.D. there so it is good to be talking to a fellow Wisconsinite.

Mr. Roth. Well, that is great. Then we are kindred spirits.

Mr. LeFaivre. Kindred spirits. Great university.

I also was in Singapore last week and contracted the Singapore flu so it is also good that we have a distance between us here. [Laughter.]

As you said, I am Rick LeFaivre. I am vice president to Advanced Technology at Apple Computer. And I am also representing the Information Technology Industry Council. ITI has been very proactive in setting or recommending public policy for the information infrastructure both in the United States and globally, working with colleague organizations in Japan and Europe, and some very exciting things are happening in that space.

What I would like to do in my 10 or so minutes is to basically try to convey to you a little bit of background about what this GII thing is all about and to try to transfer some of my enthusiasm for what is happening. I happen to think this is about the most exciting time the computer industry has seen in the 20 years or so I have been involved in it. And I think it is going to turn out to be as exciting for the United States and for the world as the industrial revolution was 200 years ago. So I want to try to give you a little perspective.

I thought I would look at it from three points of view, one from a computer industry perspective, one from a societal perspective because I think that is where this really comes to bear, and then, finally, from a governmental perspective.

The computer industry is only about 40 years old. If you think about it, that is rather remarkable in terms of what has happened during that time. The first 20 years of the industry was dealing with what we might term institutional computing, large scale computing. And it was very restricted to computer experts.

About 20 years ago the PC was born. Apple Computer and a few other companies began to really bring computing to the masses and the last 20 years have been about making personal computers that are easy to use and cost effective and powerful.

I think we have succeeded remarkably in that goal. And now PCs truly are becoming commodities. You can buy them in thousands of stores around the world and tens of millions of people are using PCs. And the question that those of us in the industry have been looking at is what is next. What is going to be the next wave of the evolution of this industry?

I think that we are going to shift our focus from computing as the focus to communications. If you think about it, how many people get up in the morning and say, "I think I will do some computing this morning." Not very many. But almost all of get up and talk about communicating, communicating with other people, you know, accessing information, news, whatever it may be. So we are in the midst of a communications revolution and the computer industry is beginning to converge with the communications industry in this thing we call digital convergence.

If you think of the kinds of new devices that are appearing on the market—I do not want to hype an Apple product by any sense, but this is an Apple Newton and there are a variety of other things like this appearing. At some point, everybody is going to have one of these in their pocket or their pocketbook. It is going to be your portal to the world of information. And what the GII is all about is beginning to build an infrastructure for that to happen.

Now if you think about what this is going to mean to individuals, if you think back about 500 years ago when Gutenberg invented the printing press and then a guy named Aldus actually 30 years later invented the portable paperback book which is what really had the impact, it revolutionized the common man's access to knowledge and information. And we have been living with that revolution for the last 500 years. And it has been playing out in the form of telegraphs and telephones and faxes and radio and television. All expanded the ability of people to communicate over distances and receive broadcast information.

Now there is a new revolution starting to happen. And in theory, all of mankind's knowledge is going to be available on line soon. Now, that is both exciting and rather scary if you think about it. First of all, how in the world do I navigate this information space and find relevant information? There are some very exciting new technologies which I will not go into that are attacking that problem.

The driver behind this growing information infrastructure, if I can use that term, is the digitization of content. In other words, everything now is going digital. We call this a digital convergence. And a bit ultimately is a bit, whether that is a bit as a piece of a movie or a piece of a newspaper or a piece of an e-mail message or a voice mail message, it is just a bit to the information infrastructure. And I think as this begins to play out, you are going to find interesting bits, if I can say that, being transmitted all over the world in interesting ways.

Now when you think about what this might mean for people, one of my techniques as a research director over the years has been to constantly ask the questions, "What If?" and "Why not?" So, a lot of what I do at Apple is walk around the hallway saying, "Gee, what if this?" Or "Why not that?" And you begin to kind of ask yourself questions, "What if everyone had a personal phone number that stayed with them for life so no matter where they were, I could just dial that number and get them?" Why not?

It is going to happen over the next few years.

What if I could send an electrical mail message to my mother in Florida as easily as I do to my colleagues at Apple? Right now I cannot, but I sure would like to.

In fact, why not send all messages electronically over time. Is it not really kind of silly to take a piece of paper, fold it up, stick it in an envelope, send it across the country or across the ocean so someone else can open it up and read it when I can zap that message there in a microsecond?

What if school kids could have access to on line information and on line experts on a call? What if I could have a custom newspaper that was presented to me each morning with the stories that I want to track, things that I am interested in? Actually, I do have one.

Why should we not do our voting electronically? Why should I not be able to say, "Vote." And we get an instant pulse from the population.

What if shopping catalogues were available on line so that I could visualize what I might look like, me, might look like with some clothes or what my own living room might look like with a new piece of furniture?

What if we could have an interactive travel channel where I could kind of put myself down in the middle of anyplace on earth and look around?

Some of this sounds like science fiction, but everything I have mentioned is happening right now. We have prototypes at Apple and other companies are doing exactly these kinds of things right now. It is going to be a very, very important evolution in terms of people's access to information and communications.

I would like to make one comment. A lot of people talk about the information highway and I really do not like that term. It sounds too static, like we are going to pour some concrete and build a highway and then it will be done and we will go on to something else. This information infrastructure is going to be an ever changing, ever evolving mishmash, frankly. I use the term, "information cloud," if you think about it, kind of an amorphous thing that is going to be evolving. We have a prototype of it right now. It is called the Internet which is a worldwide infrastructure for information dissemination and it is evolving, changing, growing, higher band width, components are being added, but it is going to be a very exciting and pack-filled thing as it plays out.

Let me give you one real world anecdote on the power of what this information infrastructure can do. When the Soviet Union was breaking up, whenever that was, I had a colleague who happened to be in Moscow that very week when the tanks were rolling through the streets at a library conference. And the Soviet hardliners tried to cut off the phone systems and take control of the newspapers and the television stations and all that, but they forgot that there were Soviets in the library community, computer science community who were on the Internet. And within minutes of that coup happening, there were messages coming out over the Internet that were being read by millions of people around the world getting, you know, minute-by-minute updates on what was going on in the Soviet Union. And that power of an individual being able to post a message and get out to millions of people is something we have just never had before.

If you think of our communications infrastructure up to now, you could make a phone call and call one person, you could receive broadcast information from some large agency like a newspaper or a television station, but we have never had the power of one person other than maybe a letter to the editor which is kind of a slow process, to really get out and get information out to millions of people. So this phenomenon that is beginning to grow around the Internet as kind of the proto-GII is going to have a profound impact on how people communicate and get information out to others.

Alvin Tofler, I was at a lecture that he gave not too long ago where he talked about his Third Wave Information Society following on the Agrarian Society of 10,000 years ago and the Industrial Society that started a couple of hundred years ago. This new society is going to be built on information. And I think that the countries that really understand the power of information and can really build an appropriate infrastructure to allow all citizens ready access are going to prosper in this new society. Countries that do not understand that I think are going to have trouble.

Luckily, the United States is taking a very clear leadership role in this area. We are well ahead of the rest of the world. We are trying to work with the rest of the world and not turn our backs on them, obviously, in moving from a national to a global information infrastructure. And I think it is going to be an incredibly exciting time over the next 5 to 10 years as this all plays out.

Finally, let me give a little governmental perspective in terms of the role that we think the U.S. Government should have in developing the GII. What the government should not do and I really want to stress this, is try to be the architect or the regulator or the driver of the GII. I do not think that is the role that government can play well in these kinds of situations. It is the role that industry is playing. We believe in a free market economy. We believe in the competitiveness of the marketplace and having these kinds of things play out from market dynamics. But there is a very important role the government can play in assisting or enabling the development of the GII. And we view the government as a very important partner with industry as we move forward and try to knock down some of the barriers that are looming in front of us in terms of making this thing real.

As I said before, ITI has been working with sister organizations in Japan and Europe to develop a set of global policies that are guided by fundamental principals that we think government should be following to enable this new world. We feel that these principals will stimulate competition and investment and provide a wide variety of new products and services to users of the information infrastructure worldwide.

So let me, if I may, just briefly go through them and then I will wrap up. First is market access. Governments really have to eliminate trade and investment and technical barriers, we think. And that is a key role to help in this space. We have got to expand and strengthen the international trading system and eliminate some of the remaining global tariffs on IT products. So I think there are some things beginning to happen in that space. I think that was a topic of a lot of discussion over in Brussels. And I think it is really important that we continue to reform our rather arcane export control system.

Second, in inter-operability, the GII is not going to happen unless we can really make sure that it is inter-operable and I think the private sector is leading the way in coming up with standards. We have existing techniques and ways of creating standards. They seem to be working. I think it is very important that ultimately when I have a series of bits coming in and out of this device that I be able to understand those bits. That is what makes the GII happen. And I think that groups like ITI and AEA are working to try to make sure that there are inter-operable standards. So that seems to be going pretty well.

Third, intellectual property, we have got to have full implementation of the GATT TRIPs agreement and ensure that content providers are encouraged to make full use of the GII and I think we need to have multilateral negotiations to resolve intellectual property issues as they come up. And there are some that we are dealing with with our colleagues overseas.

Fourth, in the area of privacy and trust, the GII simply will not happen if people do not trust it. I want to trust it to be able to send an e-mail message and not have someone read it, for example. I would like to trust it that if I send some digital cash around it is going to get there and not be stolen by someone. And that really means we have to have pervasive cryptographic techniques that are worldwide that allow secured transmissions over the GII. And this is a really important issue that I think governments and the private sector have to work out together. We have got to agree on standards for cryptography. We have got to agree on codes of conduct for handling personal data and really assuring the population that the GII will be a secure means of getting something from here to there.

Fifth, universal access, we think that private enterprise in the competitive marketplace will be focusing on trying to make this available to more and more people. And that governments should encourage the development of the whole GII and look for ways to help us provide access to the entire population worldwide, eventually. And I know that is going to take time, but I think it will happen over time.

Finally, access to R&D: It is really important to know that technology is not limited to national borders. Access to R&D and application development programs should be open to all entities worldwide. So we need to make sure, in general, as a general theme we open things up and allow this thing to happen as a worldwide phenomenon.

Let me wrap up on a little personal note. I have been a user of the proto-GII, called the Internet, since it was first developed as the Arponet over 20 years ago. And I literally could not imagine doing my job without it. I do almost no paper mail anymore. It is almost all electronic mail. I do even not as many phone calls as I used to because a lot of routine stuff is handled via electronic mail and accessing information on the worldwide web. But as I said earlier, I still cannot send a message to my mother in Florida. And so one of the things that is exciting me as a computer scientist and research executive is how can we take the benefits that those of us who have been in this game have been using for the last 20 years and begin to spread those benefits to all our citizens? And I think as this happens, again, it is going to take some time. It does not happen overnight. But I think it is going to be a very, very exciting time to begin to really leverage information technology for all citizens in the United States and ultimately worldwide.

So thank you very much for the opportunity to testify and hopefully we will have some questions in a few minutes.

[The statement of Mr. LeFaivre appears in the appendix.]

Mr. ROTH. Thank you very much, Mr. LeFaivre.

We are going to ask Mr. Harnett for his testimony and then we will go to some questions.

STATEMENT OF RALPH HARNETT, SENIOR VICE PRESIDENT, RAYCHEM CORPORATION, ON BEHALF OF THE AMERICAN ELECTRONICS ASSOCIATION

Mr. HARNETT. Thank you very much.

Mr. Chairman and members of the subcommittee, AEA appreciates the opportunity to present our views on the Global Information Infrastructure and the recently concluded G–7 summit on the information society.

Specifically, Mr. LeFaivre's comments are in many ways going to be repeated by me, but I come from a little different perspective as both a user, but in our business at Raychem, we are also a builder of the infrastructure and are concerned with whether or not the infrastructure will be maintainable and reliable over the long term. That is, will it work and will it be able to carry those bits of information at the speeds and at the reliability that is going to be required.

We are here today because of the promise that GII offers. From a business perspective, we are talking about an absolutely enormous marketplace. You hear numbers growing to $1 trillion and in some cases much larger than that by the turn of the century into the year 2010. And as we are all aware, $1 billion in market growth can create somewhere with secondary and tertiary growth, something on the order of 19,000 jobs. So whether that is all jobs in the United States or jobs around the world, the Global Information Infrastructure is going to generate a huge amount of employment.

The reasons that the market is so valued is that it also brings an enormous new quality of life. It enhances our healthcare, our education and our economic competitiveness. The promise of GII however will remain unrealized unless we have a full and effective market access in all countries. Without market access, the opportunities of the information society are severely restricted and the benefits offered by this technology are not going to be realized by the broadest base of people.

Trade barriers and structure impediments in foreign markets are destructive to the global economy and by providing its domestic industry a sheltered home market a foreign government effectively closes out opportunities for workers and companies and limits the use of the technologies that we have just heard about and severely hinders our ability to grow on an economic global basis. Global leadership in the information industry can best be maintained and enhanced by ensuring that there is equivalent access in all markets for technology, products and services.

In the written testimony that I have submitted, you will see a number of AEA principles and some of these are going to be repetitive but I think are absolutely important to focus on. That to achieve full and effective market access, you have to have open and transparent systems for standards-setting. We have to be able to ensure that the bits can in fact be transferred from point A to point B and not get lost in the process. And we have to have open and transparent procurement systems. And you can pick almost anywhere in the world today and we can find that open and transparent procurement systems do not necessarily exist. And it makes it difficult for small companies that the AEA represents to be able to get access to those markets when the procurement systems are not open and transparent.

We need to eliminate tariff and non-tariff barriers and we have to find ways to protect the intellectual property and the investments of the companies that we represent.

The AEA would like to commend the G–7 leaders for focusing the recent meeting in Brussels on such an important issue as the Global Information Infrastructure and we especially would like to acknowledge President Clinton and Vice President Gore on their vision for both the NII and the GII and for bringing those to the beginnings of what we consider an important focus for our Nation.

These initiatives to create and deploy a global information infrastructure will result in economic growth and job creation as I have already mentioned. Prior to the G–7 summit, the AEA recommended to the United States and to the G–7 that they accomplish three specific things. One, that we highlight the benefits that can accrue to all citizens through the deployment of the global information infrastructure. And as you will recall at the G–7 summit, there were a multitude of projects that were specifically demonstrated and how they might improve the quality of our lives. But there is a lot more to be done. And, further, the G–7 leaders agreed to report on the status with the goal of having those applications launched at the next G–7 conference in Halifax.

Two, we would like to emphasize that private investment in and the deployment of and usage of GII will be severely restricted without open markets and robust competition in those markets and we believe the outcome of the G–7 conference was good in that the business leaders roundtable that occurred there created an important industry forum for the discussion of open markets and competition.

Vice President Gore's speech clearly established the foundation for full and open market access. Finally, the G–7 leaders committed to open up markets to all the development of global systems so that we can in fact have full and open infrastructure and services around the world.

Special emphasis should be given to the negotiation of the World Trade Organization notably on such sectors as basic telecommunications which are important to see concluded by April of 1996 which was the target that was set. We must now follow that target and keep a scorecard to make sure that in fact we meet it.

Now as far as specific actions and established deadlines that came out of the G–7 conference. That, we got mixed results, in my opinion and in the opinion of the AEA. While industry is extremely pleased with the commitments to open market and renewed focus and commitment to GATT and its April 1996 deadline, the communique is limited in its specifics as to pursuing what pursuing liberalization means. And we all know that pursuing and achieving are two distinctly different things and the commitment to be liberalized is not necessarily the same as actually being able to monitor it. Unlike happiness, liberalization has tangible components that can, in fact, be achieved and documented.

The administration and Congress working in close partnership with industry should establish clear objectives through bilateral and multilateral negotiations to remove market barriers to the development of the GII.

Specifically, the GATT's regime must enforce the following principles in order to successfully establish competition. We should have competition rather than monopolies. We should separate an effective—should have separate and effect regulation across the industry. The authority for regulating should be separated from the infrastructure provider. This is a particularly difficult problem in some of our G–7 neighbors.

Transparent and nondiscriminatory interconnect regimes, competing providers of services and equipment must have access to public network transport facilities. Interconnection must be designed to ensure that there is parity of price and reasonable terms and conditions to ensure a nondiscriminatory competitive basis.

Cost based interconnection, rates for accessing the network and providing services should reflect costs and not be punitive so as to make the service cost prohibitive. Open and transparent regulatory process: without an open and transparent process, smaller AEA companies cannot even begin to understand how to compete in this marketplace.

The G–7 leaders must commit to these specific actions in Halifax to ensure that their commitment to open markets, dynamic competition and liberalized equipment, service and infrastructure markets is realized.

While my remarks have focused on the importance of global leadership and market access, let me highlight another critical element of the success of GII, privacy and confidentiality.

Through the technology, data, voice and image storage and transmission, a patient in a remote part of the world will have access to cancer specialists in the NIH or in the Sloan Kettering Institute. But without adequate protection on sensitive and confidential patient information that will be stored and transmitted through the GII uses for GII will be limited.

Encryption is one tool that is available to protect the owners of this data and information. And it is essential to the confidentiality integrity of the data network. But lacking this, the GII will lack the safeguards on privacy that are essential for the protection of business and consumers. And while the AEA recognizes the legitimate need of governments to enforce law and maintain national security, we believe that the privacy and trust for individuals and businesses must be addressed. And this will require a solution to be found and the products with this technology be exportable specifically for legitimate business end users.

Today, however, mass markets, and we brought along a Norton Anti-Virus program and I must say that other essential business tools are strictly controlled by the U.S. Government. In fact, Mr. Chairman, if I want to install this antisoftware device in my company worldwide I cannot do it because the export of this item is treated with the same export controls as an F–16 fighter. It must be reviewed by numerous bureaucratic organizations in the State Department. As the global information highway develops, data security and privacy will be of paramount importance to customers, both the U.S. abroad. But software and hardware providers' products embedded with encryption capabilities now represent a standard information technology feature intended to meet those security needs.

And so we have to figure out how we can not have to mark products like this with words like, "Not for Export. For use in the USA and Canada Only." A difficult problem, but one that we have to learn how to address.

So thank you, Mr. Chairman. I will cut my verbal comments off at this point in time and I know we will be happy to take questions.

[The statement of Mr. Harnett appears in the appendix.]

Mr. ROTH. Well, I thank you, gentlemen, both of you for your excellent testimony. We have been joined here by three of the more knowledgeable members of Congress. I am delighted that they are here with us.

Before I turn it over to them for questioning, let me just ask a short question to begin with. In your testimony you have mentioned the need for emphasizing open markets. Now we have had the G–7 meeting and its statement of policy. Could you give us a little run down of what we should be doing here in the Congress to keep us in the lead? I think I will direct my question, first to Mr. LeFaivre.

Mr. LEFAIVRE. We had Michael Spindler, my boss, was at the G–7 meeting and came back with a pretty good feeling of unanimity amongst the CEOs, the industrial side of things in terms of what needs to be done.

I think there is still some work to be done with some of the other governments. I think in France there are still some issues in terms of opening up some of the markets there as well as some intellectual property issues in Japan. So the feeling I got was that progress is being made, but it is not all the way there, yet. And I think the main thing the U.S. Government can do is to really keep the pressure on and keep a leadership role in terms of demonstrating to our colleagues in other countries what free and open markets really mean. So, beyond that, I mean that is kind of the general thrust.

Mr. ROTH. Mr. Harnett.

Mr. HARNETT. I think one of the things we have to keep in mind is that for most of us it is very difficult to define what the GII or NII, for that matter, really is. Mr. LeFaivre mentioned an amorphous cloud. In many ways, that is the sort of thing that we are dealing with and we need to keep in mind that it is going to be very complex. The market access issues in Asia are going to be quite different from the market access issues in the more developed countries of the world. And for us to be able to address that, I think we are going to have to ask the Congress to do a couple of things.

One would be to identify those areas in State and in Commerce and in the executive branch where they can in fact bring a lot of the different components of the GII together and to help us define that. And to begin to define some specific dates and targets for bringing some clarity and focus to the GII effort around the world. This is not something that is going to simply happen because there are so many independent pieces of the government right now looking at different parts of this. And it both precludes free and open competition in the NII as well as the issues that we have to address through things like the G–7. So we are going to have a lot of work to do. This is a very complex, very difficult issue. And we are going to need the help of this group as well as others in the government.

Mr. ROTH. Mr. Bereuter.

Mr. BEREUTER. Thank you very much, Mr. Chairman, and thank you for scheduling these timely and important hearings. And, gentlemen, thank you for your testimony.

I would like to ask either or both of you what barriers now prevent us from increasing the market for information technologies in China and in India?

Mr. LEFAIVRE. Let me take a quick comment. China in particular has some heavy duty intellectual property work to be done. As you know, it seems to be that the market in China is to buy a few thousand computers and then one copy of a piece of software and that will do it. So, somehow we need to get the Chinese Government to understand the value of software as a form of intellectual property?

Mr. BEREUTER. How optimistic are you in light of the recent agreement?

Mr. LEFAIVRE. Well, I do not pretend to be an expert in that space, so I do not know that I am optimistic or pessimistic. I just know that it is going to be a very—if that market is going to open up over time and they are going to be a player in this game, they are going to have to come to grips with things like intellectual property.

Mr. BEREUTER. Do you think we have any significant leverage to utilize in the area of technology itself, aside from the political maneuvering and MFN and all the other kinds of pressure or techniques we have?

Mr. LeFaivre. I do not pretend to be a policy expert in these things. I am a technologist, but maybe I can defer to my colleague.

Mr. Bereuter. Mr. Harnett, do you want to try?

Mr. Harnett. Let me tackle this one because I think in one way it does very much highlight the difficulties of identifying what a GII issue is. China does not have any infrastructure so to speak when it comes to a true, even telephony based system. They have one telephone per 100 people in China. They would like to change that and bring that to 10 telephones per 100 people by the turn of the century. That means they are going to build a Bell South every year for the next 6 or 7 years. It is that big a deal.

So one of the barriers, one of the specific barriers in China is actually developing an infrastructure over which even things like the Internet or any kind of communications system can in fact exist.

So one of the things in terms of one of the levers that we have is that we are very capable in this country in terms of helping build infrastructure. If you look at the number of R-box of the local exchange carriers, et cetera, that are now doing deals outside the United States to try to help and develop infrastructure build, that is one of the ways that we do have leverage in my opinion. So it is not just a computer and a piece of software. It is much broader than that. It is the infrastructure to in fact interconnect the interoperability issues, the software issues, et cetera. So we have only tackled one small part of the intellectual property issue with our most recent bilateral agreement. But it is a good start. It is a start.

The real issue now becomes one of getting a report card out, maintaining and using our USTR resources to keep track and report on how we are doing. But we are going to have to broaden that and we are going to have to use some of the levers that we do have.

Mr. Bereuter. Now we, of course, would like to see American firms sell that information technology even if we are talking about relatively unsophisticated technology as compared to the United States' current state of affairs. Is it important beyond the jobs that we gain, is it important in advancing the GII that it be American technology? Or is it unimportant in that respect?

Mr. Harnett. Well, I think I will state very specifically that I think we are right now the world leaders in global information technology, period.

Mr. LeFaivre. Yes. There is no question.

Mr. Harnett. And so, therefore, it is important to the global information infrastructure that it be American technology. It is also important that we protect that technology as we go forward in a place like China or India to protect it so that we as American companies that have invested heavily in the research and development to get to that stage receive fair compensation and the revenues associated with that.

So, from my perspective, doing business in China today, which we do have a significant business in China today, we move very cautiously and work very carefully to protect those specific pieces of technology that we are going to bring into the country, developing that product in America and exporting it to China.

Mr. Bereuter. Our country's trade strategy has recently been developed to try to emphasize more sale of American major project infrastructure abroad including telecommunications and information technology. And, yet, we find that in many cases our export promotion programs, our credit programs, our loan guarantee programs, our insurance programs do not match that of our major competitors. And we are also finding that in some respects organizations like EXIM Bank despite some innovations still are much slower in responding to opportunities as compared to some of the major export competitor countries' similar agencies.

Do you have any comments about remedies for that? About the current controversy we face in the Congress where so many of our members particularly new members today think of OPEC funds and Trade and Development Agency funds and Export-Import Bank funds as being corporate welfare?

Mr. HARNETT. I can comment briefly. I am not an expert on specifically the financing and some of the issues that you raised, but I do know that we use EXIM Bank and have in the past.

I think from our perspective those are facilitators in helping us do business in some parts of the world. I like to believe that our—if I was playing on a level playing field in that country with regard to tariffs and barriers and regulations and specifically the kinds of technical specifications that they use that if I could eliminate those, I can compete almost anywhere in the world today on the basis of technology because I can win in many of those countries.

You could also add to your list some of our competitors in other parts of the world come to the table with what we would consider to be inappropriate financing to give them competitive advantage. And that has also occurred. But from my perspective, we have got the best technology in the world and given a level playing field and given the opportunity, we can win almost anywhere in the world.

Mr. BEREUTER. Thank you, Mr. Chairman. I yield back so my colleagues can question.

Mr. ROTH. Thank you very much, Mr. Bereuter. We always appreciate your intelligent and incisive questions and I appreciate your commitment to this issue very much.

We will call on one of our new members, Mr. Chabot, from Ohio for any questions he may have of our witnesses.

Mr. CHABOT. Thank you, Mr. Chairman.

You referred to I believe it was the anti-virus software on the desk there. Could you elaborate on why you cannot export that or what the dangers are or are perceived to be?

Mr. HARNETT. Again, what I would like to do is ask Mr. Barth from Motorola to comment, because Motorola is a much more affected party here and I think we could—Rich, where are you?

Mr. ROTH. Why do you not take that mike and pull it up closer so that we can hear you? It is voice activated. Please introduce yourself and give us your title.

Mr. BARTH. Thank you. My name is Richard Barth. I am with Motorola's Washington, D.C. office, Assistant Director for International Trade Relations and I have worked on export control issues for some 10 years now, both inside and outside the government.

Many shrink wrap software packages such as this one that I found on the shelf of a local computer software store have this label, "Not for Export," because they have some form of encryption technology built into them. And virtually all encryption technologies of any sort with very few carve-outs are controlled under very strict controls by the State Department as munitions items.

The Iridium Satellite System, which is over here on the adjacent table, was mentioned in a brief meeting this morning by the chairman. For example, because of encryption technologies and other related satellite technologies, this system will require some 500 export licenses, principally from the State Department, before that system is up and running in 1998.

The extent of these controls, the breadth of them and their reach down into everyday products is really the point that Mr. Harnett was trying to make here this morning, that has become a competitiveness problem for American industry.

Mr. CHABOT. What recommendations would you make if you were in charge? What changes ought to be made to make that restraint on trade better than it is?

Mr. BARTH. Speaking personally from my experience working on the encryption issues through the Bush and some of the Clinton administration on the National Security Council, I have a very strong agreement with the government's desire to control encryption technologies fairly tightly. And I do not dispute the need for law enforcement purposes and security reasons to control these things tightly.

The problem is they are batched with all other munitions controls under the State Department's regime in a way that requires the individual export of these things often to be referred out to the anti-terrorism bureau at State, the human rights bureau at State, the desk that covers that region of the country at State, the political military bureau at State. None of these bureaus at State are the reason that these things are controlled by the State Department. They are controlled there because law enforcement agencies like the FBI and the National Security Agency out at Fort Meade have a good and valid reason to exercise those controls. But the State bureaucracy, the State process, twists it up and captures industry in a hammerlock for sometimes months on what should be very straightforward exports.

Mr. LEFAIVRE. If I could make a comment from a technical perspective? The problem with the encryption control statutes is that encryption technology is a case of the barn door is open and the horse is gone already. This technology is out in the world. There are graduate students in Europe who can write great encryption software that we are not allowed to export inside of our machines, even though they can write it over in Europe already. I think I am worried that we are trying to control a technology which is already kind of known now. There are textbooks being written on it. There are people out there who know how to do very, very good encryption and, personally, as a technologist, I do not see how we can kind of put it back in the bottle at this point.

Mr. BARTH. If I could just supplement briefly? You did ask a specific question of what could be done to remedy the problem. From Motorola's perspective, we can tolerate the regime that requires NSA's tight control even under the State Department's regime, but you have to remove the other bureaus of the State Department from this time wasting inappropriate level of oversight. Thay are not at all germane to the reason encryption is controlled. NSA should be the control point and the choke point and delete the referral to all these other bureaus that simply take time.

Mr. CHABOT. I would like to follow up with you, not in this meeting because I do not want to take up this whole meeting, but if you would not mind, I think our office will probably be in touch with you because I would like to follow up on this issue and see if we can do something about this.

Mr. LEFAIVRE. Great.

Mr. CHABOT. It is rather absurd the lengths to which we are apparently going to prevent technology which is already out there and we would be happy to help you. We will get in touch with you. Thank you.

Mr. ROTH. Mr. Chabot, we thank you very much. And we do have a bill called the Export Administration Act. I know that you are conversant with it. We are going to look to you for your expert help in that area and maybe we can zero in on some of these problems at that time. Thank you.

I would like to call on our good friend, Mr. Rohrabacher from California, a state that is very much interested in this technology.

Mr. ROHRABACHER. What did you say that thing was over there?

Mr. HARNETT. It is an Iridium Satellite. That is one of the satellites that is intended to provide us with a wireless future.

Mr. ROHRABACHER. Wireless?

Mr. HARNETT. Wireless future for communications. This is one of the new satellites——

Mr. ROHRABACHER. That is the satellite itself?

Mr. HARNETT. No, no. That is just a model.

Mr. ROHRABACHER. Scale model?

Mr. HARNETT. I would assume it is a scale model.

Mr. BARTH. Approximately one-tenth scale.

Mr. ROHRABACHER. So that would be one-tenth the size of what you would be putting up there.

Mr. HARNETT. It would still fit in the room.

Mr. ROHRABACHER. And that would permit us to have wireless communication anywhere in the world, just like a telephone that you can call anywhere in the world?

Mr. HARNETT. That is one of the intentions, right.

Mr. ROHRABACHER. And when would a system like that be in place if we make sure that the people who were trying to put market restrictions in your way are pushed aside so that you can do your job?

Mr. HARNETT. Do you guys know when you are going to have it?

Mr. BARTH. In 1998, there are 66 satellites——

Mr. ROTH. Please speak into the mike.

Mr. BARTH. I am sorry. I thought I was done with encryption. Sixty-six of those satellites should be orbiting by 1998 and the system should be turned on and the small handset that is on the right there, roughly the size of the cellular phones that you can buy today, will tie you into that system globally.

Mr. ROHRABACHER. You are going to have those up in orbit by 1998?

Mr. BARTH. We are building them virtually today.

Mr. ROHRABACHER. Where are they being built?

Mr. BARTH. They are being assembled in Chandler, Arizona.

Mr. ROHRABACHER. Why are you not building them in California? [Laughter.]

Mr. BARTH. Because Motorola has the contract, not Hughes.

Mr. ROHRABACHER. Well, that is too bad.

And so you are building 66 of them. Do you plan to use—who is going to be launching those satellites?

Mr. BARTH. The launch scheme currently calls for a mixture of United States, Russian and Chinese launch vehicles. That is part of the export control licensing regime we spoke of. And there are various reasons for the launch scheme. One is to position satellites at various places. But perhaps more importantly, large portions of the world's population and land mass are within the reach of those two countrys, particularly population with China and landmass for Russia. They do not have the money to buy into this kind of system to allow access to their people to the system. They are providing equity in the form of launch services.

Mr. ROHRABACHER. So that once these 66 satellites are up, anybody with one of those little cellular-type telephones in their hands will be able to call anywhere in the world for what price?

Mr. BARTH. The currently estimated price is $3 a minute.

Mr. ROHRABACHER. $3 a minute anywhere in the world.

Mr. BARTH. Right.

Mr. ROHRABACHER. And will the nation, for example, that some person in China wants to call over here, will the government of that nation be able to intercept or stop or tax the communication?

Mr. BARTH. It will be exceedingly difficult to do anything but block the signal for the reason that it is digital technology. I will let Mr. LeFaivre go into that in greater detail, but they are very difficult to tap into.

Mr. ROHRABACHER. And they would not be able to tax it either?

Mr. BARTH. Tax it? Depending on where the ground station is that draws the signal back down, they could tax it, depending again on all the features——

Mr. ROHRABACHER. So they would have to tax the ground station. From the ground station. Would there be ground stations in China with this?

Mr. BARTH. No. As far as I know there are currently no ground stations scheduled to be located in China.

Mr. ROHRABACHER. Where will the ground stations be built?

Mr. BARTH. The United States, I am not sure if it is Hawaii or in the continental United States. One is in Italy and I do not recall where the third one is.

Mr. ROHRABACHER. And that would tap into the regular phone lines after it went to the ground station?

Mr. BARTH. At that point, it will enter the international switching network.

Mr. ROHRABACHER. Well, I will tell you that if you actually succeed in this project, that you will be tearing down the walls of tyranny as no other group of people that I know have done in my lifetime. I do not see how a tyrant can withstand that type of open communication. And it just is beyond me how the Communist Government of China is going to permit you to do that. I wish you luck.

How much is that going to cost? The whole system?

Mr. BARTH. The whole system will be, depending on how you calculate it, between $3 and $6 billion.

Mr. ROHRABACHER. Well, it is not all that much. [Laughter.]

Mr. BARTH. In government units or what?

Mr. ROHRABACHER. Well, our administration gave more away to Mexico last month.

Mr. BARTH. Touché.

Mr. ROHRABACHER. Well, I wish you luck. And we will continue to work with you. I wish you were doing this in California. I am sure that some of the rockets that put this up will be built in California. I wish you luck. And I know everyone on this panel will be working with you and this is the type of thing that makes the world a smaller and a better place. Thank you very much.

Mr. CHABOT. Will the gentleman yield?

Just following up, if you want to build it in Cincinnati, we would love to have you there, too. [Laughter.]

Mr. ROTH. We have had some excellent questions here this afternoon. We are going to go around one more time. You know, Mr. Rohrabacher said it is going to smash tyranny. And as far as China is concerned, I do not know how China could keep you out. I mean this is amazing technology. But not only are you going to smash tyranny, I think the nation state as I see it is also going to be smashed. Earlier, Mr. LeFaivre talked about the portals. And he talked about some of the other things that were taking place—Gutenberg in the 15th century. I wonder whether we are faced with as great a change in the world today as we faced in 1500 when Columbus discovered America and Coperincus found out the earth was not the center of the universe? And as was mentioned, the earth was not flat, the earth was round, and all the other changes that took place at that time? Are we facing that kind of a world today?

Mr. LEFAIVRE. I personally think we are underestimating the impact that this is going to have. You go back to the Gutenberg revolution of 500 years ago and I think this is going to be at least as impactful as the concept that everyone could actually own a book. The idea that anyone in the world can get access to any other person or any piece of information at anytime or broadcast a message out to millions of people—now there are some problem this creates. Information pollution is going to be a big problem.

We are working on things like intelligent filters that filter out junk mail so you do not see it and things like that. But as it plays out I think it is going to have a huge impact. And I agree with the Congressman that I just do not see how totalitarian regimes can withstand this kind of open communications infrastructure as it plays out. So I think in that sense it is goodness.

Mr. BARTH. Mr. Chairman, again, I would just like to supplement by saying our principal concern is not that the Chinese will keep it out. Our concern is with the hundreds of export licenses that may prevent it from getting in.

Mr. ROTH. So that is where we come in.

Mr. BARTH. Thank you. Yes.

Mr. ROTH. We are looking for your help in that area.

Now you talked about these portals to the world and so on, what kind of a society do you have to have? What kind of educational system do you have to have to utilize all that information?

Mr. LEFAIVRE. That is a good question and to me it is a chicken-and-egg question. I think you need an educated populace to really exploit and take advantage of this kind of infrastructure. By the same token, I think this kind of infrastructure will lead to a more educated populace.

Apple does a lot of work with schools and schools are jumping on the Internet like you have never seen because they see the value in kids getting access to other ideas, getting access to information. We have an experiment we are doing where scientific experts at the Exploratorium in San Francisco make themselves available to school kids over a multimedia video conferencing system to answer questions.

They could not actually take the time to drive around to all the schools, but they are quite willing to take 15 minutes a day and pop up and answer a few questions from different classrooms. And as that kind of access to remote information and expertise plays out, I think it is really going to help the educational system. So I do see kind of a chicken-and-egg bootstrapping as this moves forward.

Mr. ROTH. I was impressed when I was back in Wisconsin in a small community by the name of Hortonville, which is adjacent to Appleton, and I walked into the new school. There is no library. It is amazing.

Mr. LEFAIVRE. It is multimedia.

Mr. ROTH. Yes. The kids just pick everything up right off the computer. And every kid is doing his homework on his computer and so on.

Mr. LEFAIVRE. I wonder who is going to buy the last paper set of encyclopedias. I do not know how many of you sold encyclopedias when you were young. I did a couple of months.

Mr. ROTH. The greatest paper making place in the world, of course, is on the Fox River with Appleton, and Green Bay, Wisconsin. [Laughter.]

Well, let me call on Mr. Bereuter, but before I do, you know, this is a double-edged sword because what you have here really is the guillotine of the nation state. Because when you have this type of technology, you are not going to have borders.

Mr. HARNETT. Yes. I think that is one of the reasons it is called the Global Information Infrastructure. This is a global economic engine that this is going to begin to create. And you asked, Mr. Chairman, a minute ago about what issues still may stand in our way. And I think one of the things—how fast might this happen? I think one of the real issues we have to face up to is we have to deal with some of these market access issues. You cannot have this kind of technology sitting only in one country. To get there we have to strip away the barriers that allow us to use this interoperability, this communications system across borders.

Mr. ROTH. Mr. Bereuter.

Mr. BEREUTER. Thank you, Mr. Chairman.

Mr. Harnett, you know our difficulties in liberalizing telecommunications with respect to the European Union and even greater problems with Japan among many other problems and trade liberalization. With respect to moving towards a global information, a set of global information infrastructure, how do we—are there great disadvantages if in fact those countries do not liberalize their telecommunication bureaucracy, the limitations, non-tariff barriers? Are there greater disadvantages to them? Is there any leverage there? If they simply do not liberalize, they in fact are placed at a disadvantage to the rest of the world?

Mr. HARNETT. I absolutely believe that is the case. And in my opinion and I think the opinion of many now, if we do not look at this as a global issue and tackle it as a global issue, those countries who choose not to liberalize their interface, they are doing this because they believe they are going to protect their own industry and their own jobs. And in effect they are going to put themselves at an enormous competitive disadvantage going forward in terms of being able to develop and communicate and work on next generation projects.

I mean all of us today at least in global companies in the United States are faced with developing products in multiple site locations. We develop a product in northern California in partnership with somebody in Keslo, Belgium in partnership with somebody in Swendon, England. And we are all working at the same time on an infrastructure, on a global information highway that exists today. And we do that faster and more competitively because we have access to that information infrastructure.

Countries that do not participate in standardization of specifications and do not participate in opening their marketplace and having an equal playing field, they are going to put themselves at a significant disadvantage. And I think you are going to see the difference grow greater and that the difficulties of implementing, bringing that together is going to get harder for them later on. It will become more and more difficult. So I think it is important that we as a country and as a government espouse the belief that now is the time. If we strip these barriers, these market barriers away, we will have a better global information infrastructure 5 to 10 years down the road than if some countries do not participate.

Mr. LEFAIVRE. If I may make an additional comment. I think one of the challenges is to make sure that we constrain this to the telecom market. We know there are issues in terms of market access for telecom. They are being worked on.

I agree with you, I think that it is to the advantage of those countries to kind of get with it and get open. But I also want to make sure that we do not expand or allow these countries to expand to other aspects of the GII. So we would like to contain this to the telecom world where it is already a problem.

Mr. BEREUTER. I am not sure I understood that.

Mr. LEFAIVRE. What I would not like to see—well, take things like the encryptography exports, export controls on computers. This is—this little chip is a Power PC 604 chip which is about 2.5 times the Cray One in compute power. As I understand it right now our colleagues who manufacture these chips cannot ship them out—cannot ship them to certain places in the world, whereas we can ship a MacIntosh computer built around this. So I would like to make sure that some of the problems we have in telecom do not extend to some of the other components of the GII whether it is software or hardware related.

Mr. BEREUTER. Thank you. I will come back to that in a second. Japan, as prototypically a post-industrial society it would seem, would depend upon being on the cutting edge of information technology, at least as much or more than most countries on earth. And so if in fact they do not liberalize telecommunications, it would seem they would be among the nations most severely and early disadvantaged. Is that true or am I grasping for leverage that does not exist?

Mr. HARNETT. Japan is a particularly difficult one because in fact in many instances they have very good technology at the current time.

I think the real disadvantage comes if you cannot interconnect into the Japanese network in the future, it will in fact put them at a disadvantage longer term, but I do not see that as a particular difficult problem for the Japanese at the moment.

Mr. BEREUTER. Unless we make it one.

Mr. HARNETT. Unless we choose to make it one.

Mr. BEREUTER. Mr. Barth, could I ask you to come to the table one more time, please?

Your comments stimulated me to think about several issues. I struggle with this matter of encryption, too, on the Intelligence Committee and serving on this subcommittee, and you have had that experience. And you talked about the reviews that are conducted at State that in some ways have nothing to do with encryption and the process therefore being a lengthy and convoluted one. Encryption can hardly be seen as something that has an impact on human rights considerations, for example, whereas some kinds of things on the munitions list indeed could. Would it be possible or advantageous to establish an encryption list taking those items off with entirely different set of reviews, agencies responsible, but just focus on the national security implications of encryption with the appropriate agencies involved in the process, but without all of the other reviews and baggage that goes with, all the other elements that are appropriately on the munitions list that has something to do with weaponry, for example?

Mr. BARTH. Yes. I would state for the record that both of the associations that are represented here today are strongly in favor of removing these controls in their entirety because of what they perceive to be the inability to control the technology in any event.

Mr. BEREUTER. I did not quite say that, you noticed.

Mr. BARTH. I just wanted to say that for the record. So speaking for myself and I believe representing Motorola also, however.

I would say that there is a very easy way of doing that. It would require absolutely no legislation. I know you do not necessarily want to hear that. It would require a simple delegation of authority from the Secretary of State down to the Munitions Office that this one category of encryption technologies which are very specifically listed on the munitions list will not be referred to any agency other than NSA for review.

Mr. BEREUTER. It is not that Mr. Roth and I want to pass legislation. It is just that we have been sitting through conferences on Export Administration Acts now most of our career. And we know that in order to move some things you have to do it statutorily because you do not get those kind reviews and baggage that goes with, all the other elements that are appropriately on the munitions list that has something to do with weaponry, for example?

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Mr. BARTH. I would be very happy to provide you with something that would be less than 100 words that would result in that net effect.

Mr. BEREUTER. Could you direct part of your thought, at least, to establishing an entirely new list with entirely different procedures, review processes and agencies involved?

Mr. BARTH. Yes.

Mr. BEREUTER. I see, for example, no reason for State to be involved in a process on an encryption list.

Mr. BARTH. I would certainly agree with that. And you could very easily create a separate regime, a separate carve-out for that. We have separate regimes for certain types of financial transactions that are controlled solely by the Treasury Department under the Office of Foreign Assets Control.

We have certain nuclear exports that are controlled solely by the Energy Department without any outside influences. You could very easily craft the exact same sort of regime. It would be administratively more awkward, it would expand the number of regimes out there. But, yes, you could do that.

Mr. BEREUTER. If the process is expedited, if in fact we protect our national security but also enhance our export base, then I think it is worth having a different subset review process in some agency.

Mr. BARTH. But just streamlining that review process and reducing the cycle time to get those licenses out would help us inordinately.

Mr. BEREUTER. Well, I at least would appreciate very much your assistance on that and your continued thoughts about it. Thank you.

Thank you, Mr. Chairman.

Mr. ROTH. Thank you, Mr. Bereuter.

The testimony that we had here today is to me just absolutely amazing. I cannot find words to really express it because when I see five of us here with the little telephones, I realize that you could be anywhere in the world, and I could sit in my living room and I could talk to you. I mean this is just mindboggling, the future that it opens up for us.

And, as Mr. Bereuter mentioned, we have been wrestling with and working with the Export Administration Act and I want the people in Congress to be sensitive to what this legislation means because it is somewhat esoteric and difficult for people to understand at times. I want to use this testimony that we had today to inform other members of Congress as to what is involved here. So I very much appreciate the testimony and I appreciate your help as we move the Export Administration Act through Congress.

Thank you very much.

[Whereupon, at 3:09 p.m., the subcommittee was adjourned.]

APPENDIX

RICHARD A. LEFAIVRE
VICE PRESIDENT, ADVANCED TECHNOLOGY
APPLE COMPUTER, INC.

ON BEHALF OF THE INFORMATION TECHNOLOGY INDUSTRY COUNCIL (ITI)

Mr. Chairman. I am Rick LeFaivre, Vice President, Advanced Technology, Apple Computer, Inc., and I am testifying on behalf of ITI, the Information Technology Industry Council. It is a great honor and pleasure to appear before your Committee today to present our views on the emerging Global Information Infrastructure—GII—and the enabling role of government in that process. We commend the Subcommittee for calling this hearing and look forward to working with you during the 104th Congress to move the GII agenda forward.

ITI's members, the leading U.S. providers of information technology products and services, had worldwide revenues of $259 billion in 1993—nearly one third of the global total IT revenue. ITI's members employ more than 1 million people in the United States. These companies are responsible for over 20 percent of all U.S. industry-funded R&D and 60 percent of all information technology R&D.

ITI's members strongly support open trade and development of global markets. The global marketplace is extremely important to ITI members, as typically over 40% of their revenues are derived abroad. Their economic health depends on a broad-gauged U.S. policy aimed at facilitating their efforts to compete worldwide. Therefore it is no accident that we take such a keen interest in the GII and in the challenges it raises for business and government.

In our statement, ITI will present its vision of the GII. We will provide an overview of the principles that we believe must be adhered to for the GII to achieve its potential. We will summarize our efforts to move the GII agenda forward, paying particular attention to the outcome of the recent G-7 ministerial in Brussels. And finally we will present to you our view of actions that the U.S. government can take that will best enable the process in the critical area of market access.

The GII Vision

The Global Information Infrastructure is a complex phenomenon, more than just a "network of networks." It is, in fact, a structure integrating many elements: 1) the communications infrastructure—including telephone, cable and wireless systems; 2) the computers and appliances that process information and allow people to physically interface with the infrastructure; 3) the software and applications that enable people to use information; 4) the content or information (whether audio, video, text, or images); 5) the with the infrastructure; 3) the software and applications that enable people to use information: 4) the content or information (whether audio, video, text, or images); 5) the people and companies who develop, manufacture, sell and service the networks, and 6) the customers who use it.

We believe that the GII is already making possible previously unimagined productivity and communication improvements. We believe that the GII will ultimately completely change—and dramatically improve—the way people around the world live, work, learn and interact with each other.

But as the leading providers of the products and services that support the GII, we also deal with many obstacles to the realization of the GII—many complex public policy issues that must be resolved here in the U.S. and around the world.

GII Principles

We first called for an aggressive GII public policy agenda in ITI testimony before the Administration's Information Infrastructure Task Force. In that testimony we articulated principles that we believed must be adhered to for the GII to move forward. We used those principles as a basis for a Common Views paper that was accepted by our sister associations in other nations around the world. Last January, working with EUROBIT and JEIDA, our European and Japanese counterpart organizations, ITI led in the negotiation of a "common views" paper, resulting in our publication, *Global Information Infrastructure (GII)—Industry Recommendations to the G-7 Meeting in Brussels, February 25/26, 1995*.

The organizations representing the world's leading producers of IT products and services—ITI, EUROBIT and JEIDA— maintain that global policies guided by these principles will stimulate competition and investment, and ultimately provide a wide variety of products and services to users of the information infrastructure world-wide. Briefly, these principles are:

- Market Access—We believe that governments must move to eliminate trade, investment and technical barriers to stimulate the free movement of products and services for the GII across borders.

- Interoperability—The critical key is open interfaces. Reliance on a private-sector-led voluntary international standards process, allowance for proprietary technologies in standards, where needed, and participation by the government in supporting the private sector standards process will accomplish the goal of interoperability in the GII.
- Intellectual Property—Full implementation of the GATT TRIPs Agreement will ensure that content providers will be encouraged to make full use of the GII. As the GII evolves, bilateral and multilateral negotiations should take place to resolve any new intellectual property issues. Educational efforts on the importance of protecting intellectual property will help to ensure the success of the GII.
- Privacy and Trust—Without pervasive cryptographic techniques, there can be no basis for privacy or trust. Agreements on both legal and technical issues must be worked out among governments, industry and users. Governments worldwide must further agree on codes of conduct for handling personal data.
- Universal Access—Governments should encourage the development of widely available interoperable and interconnected networks and, where subsidies are needed, they should supplement the competitively delivered services to cover those who cannot afford access.
- Access to R&D—Technology is not limited to national borders. Access to R&D and application development programs should be open to all entities contributing to the general economic benefit of the funding country or international organization.

This is a brief summary of the points in the paper. We intended to send a clear signal to the G-7 ministers that their goals of bringing the information age to their citizens can best be accomplished through elimination of regulatory barriers as rapidly as possible and encouragement of competition.

The G-7

The communiqué issued after the G-7 was a step in the right direction. ITI believes that much remains to be done. Specifically:

- Agreement still must be reached on cryptographic techniques to be used in the GII and on procedures for their use.
- Full implementation of GATT TRIPs and resolution of any new intellectual property issues in multilateral negotiations deserve attention.

- It is the marketplace that will determine the availability of services. Agreement to avoid premature designation of new "universal services" and, if subsidies are deemed necessary, to subsidize users, not providers.
- Creation of an institutional communications channel with public authorities in other countries to ensure maximum circulation of information on new R&D programs and new application for information infrastructures.

And, in the critical area of market access, we see six remaining areas to be negotiated:

- Liberalization and privatization of the telecommunications sectors.
- Abolition of customs tariffs for information technology and telecommunications technology products.
- Elimination of export controls for information technology and telecommunications technology products—at least for OECD countries.
- Elimination of discriminatory investment barriers, procurement practices and technology access requirements.
- Harmonization of trade-related administrative procedures consistent with GATT/WTO policies.
- Broadened provisions and signatories to GATT/WTO trade agreements; conclusion of OECD Mutual Investment Agreement negotiation; greater role of regional development banks in promoting market access.

ITI Initiatives

ITI will work with its industry colleagues around the world to develop a common set of GII principles and a common strategy to ensure those principles are accepted by our respective governments is a key component in our ITI GII agenda. But it is by no means the only component. We are working in other trade and technology areas of vital importance to our global competitiveness and, ultimately, to the success of the GII.

Market Access Initiatives

Information Technology Agreement

Our members experience is that access to global markets for information technologies provides high paying jobs here in the United States and around the globe and contributes to a better standard of living for everyone who benefits from these products and services. Expanding and strengthening the international trading system is a single critical role the U.S. Government can play in advancing the GII.

Toward that end, we have presented a well developed proposal for an Information Technology Agreement to Ambassador Kantor. The Agreement covers the elimination of remaining tariffs on all computer hardware products, semiconductors and integrated circuits and computer software by the year 2000. Tariffs were already cut significantly during the Uruguay Round. But they were not eliminated, which was the goal of every US Administration involved in the Round. For most information technology products, we are left at de minimus value rates, resulting in a situation where the cost of complying with customs red tape now exceeds the amount of duties paid.

Total tariff elimination would demonstrate international support for making the benefits of the GII available at the lowest possible cost. The elimination of tariffs in the proposed ITA would make information technology products and services more price-competitive in global markets; it would also alleviate the administrative burden borne by companies and customs authorities in ensuring accurate, complete and timely payment of duties; and it would reduce the propensity of governments to complicate and manipulate valuation, product classification and origin rules for reasons of tariff protection. All of these achievements are consistent with the essential aspects of GII as explained earlier in my testimony.

We have urged USTR to place the ITA high on the international negotiating agenda and make strong statements of public support. Such a sectoral approach would be more acceptable than doing another GATT treaty. These actions would send a clear message that the world's industrialized nations are seriously committed to pave the way for the GII by opening markets and dropping barriers.

Export Control Reform

Export controls represent the largest trade impediment imposed by our government that we face. We are pleased that this subcommittee recognizes that export control reform has an important role to play in the GII. And ITI, along with our sister associations here in the United States as well as Europe and Japan, asks you, as the chief policy making House Subcommittee in US export controls to carefully consider three important areas in which export controls constitute a major barrier to the GII:

- Residual U.S. controls on exports to our closest allies;
- Related to that, an increasing trend toward extraterritorial application of U.S. export control law; and
- The most difficult—yet important in the GII context—U.S. controls on the export of encryption technology.

License Free Zones

The United States continues to require export licenses on certain dual use items to our closest allies in Europe and the OECD world, where well over 80 percent of U.S. overseas markets are located. These countries are the U.S.'s staunchest allies, and have long been recognized through the grant of special licensing treatment for their willingness, ability and dedication to cooperate with the U.S. in export controls. They remain subject to controls, yet, to our knowledge, no license for computer exports to these countries has ever been denied.

Without license free zones, commercial products such as parallel computers which will form the very core of the GII, are subject to the most rigorous licensing requirements. And U.S. computer exporters will have to bear the high administrative costs of obtaining licenses to export. I'll cite the example of commercial workstations. When exported individually, these products are unlicensed. Yet, when their performance is combined, they exceed the supercomputer definition, subjecting them to the toughest of U.S. export controls. We do not believe that any computers should be controlled for export to the OECD countries.

Your bill, H.R. 361, like its predecessor in the previous Congress, anticipated this issue by providing for license free treatment on dual-use items on exports to our OECD partners. It is important, if the GII is to be realized, to clear away these controls as you have proposed in H.R. 361.

Extraterritoriality

Another export control issue of grave concern to our industry is extraterritoriality. As you are aware, in the past our government has made mistakes in the extraterritorial application of U.S. law which have resulted in numerous lost business opportunities for U.S.

companies, while simultaneously not achieving the stated objective of the control. If the U.S. continues to try to impose its export control rules on other countries, it will merely drive customers and joint venture partners away from dealing with us. Our allies are simply going to refuse our restrictions on their licensing decisions.

As we consider the opportunities presented to American exporters and to U.S. government economic and foreign policy interests by the advent of the GII, ITI urges extreme caution in this area.

New legislation has been proposed in this Congress which would expand significantly the unilateral and extraterritorial application of U.S. law. ITI is concerned about the impact of such proposals on our major markets in the OECD countries. Will they once again result in American products being designed out of European contracts? What impact would that have on American GII objectives?

We suggest that the Subcommittee should hold hearings on unilateral controls and look into the activities of the Office of Foreign Asset Control, whose export controls have grown rapidly in recent years without congressional oversight. It is vital to ask whether the impact such unilateral and extraterritorial actions have on the target country will not significantly be outweighed by their impact on American participation in the GII.

Encryption

The most pressing export control question involved in the GII consideration is that of American munitions controls on encryption exports.

Trust in the global networks is a major prerequisite for the GII. Without trust in the security of these networks, GII users will not subscribe, and providers will be reluctant to provide content. The need for trust will become increasingly apparent as GII becomes the home to more and more assets and the source of increasing wealth. The GII will not simply be a public data base, containing libraries or pointing users in the direction of certain public services. It will, if properly executed, be much more than that.

For example, health providers will use the GII to store and exchange sensitive medical data about patients. Portions of data will be made available to insurance companies to speed the accurate processing of claims. And the banking industry, already expert in electronic commerce, will become increasingly dependent on the GII for national and global transactions.

These are only a few examples of data sent electronically over the GII networks that need to be protected. The stakes are high when one considers the GII's applications for business and government.

Technology can play a vital role in helping to protect the owners and users of such assets on the GII. That technology is encryption. The issue is trust in the network. Encryption provides that trust. And, quite frankly, we do not believe that the GII will advance without it.

Standards and Intellectual Property

Standards enabling interoperability are a vitally important component in the success of a global information infrastructure. Unlike my preceding comments, which stressed the need for immediate government action, in the standards area we ask, for the most part, for government support of private sector action.

ITI believes that the open, voluntary, private-sector-led, consensus standards development process that has worked so well in the U.S. and internationally is clearly the best vehicle to develop the increasingly complex standards needed for interoperability in the GII. This voluntary process has produced many benefits:

- An open and voluntary process;
- Nondiscriminatory access to standards on reasonable terms and nondiscriminatory conditions;
- Interoperable products in competitive markets; and
- Protection for intellectual property rights used in a standard.

Here in the U.S. the standards process is coordinated by ANSI, the American National Standards Institute. Thousands of product developers, product users, and technical experts participate in developing standards in the organizations that ANSI accredits. These organizations include, among others: X3 Information Technology, sponsored by ITI; T1, Telecommunications, sponsored by ATIS, the Alliance for Telecommunications Industry

Solutions, TIA, the Telecommunications Industry Association; and IEEE, the Institute of Electrical and Electronics Engineers.

But the GII effort is a global one, and there are structures in place to facilitate the development and adoption of international standards. In fact, many international standards are adopted from standards or technology first developed in the United States. This is due to the strength of the existing U.S. standards development process and the merits of U.S. technology.

ANSI and the U.S. National Committee of the International Electrotechnical Commission (IEC) work through the International Organization for Standardization (ISO) and the IEC, respectively, providing a single voice to reflect the consensus U.S. position as recognized in the 1979 Trade Act. Consensus U.S. positions are also developed via an open public process for International Telecommunications Union (ITU) global standards development.

Although the international consensus process that leads to international standards sometimes requires more time than would be required to establish a U.S.-only standard, international standards are clearly preferable for the GII and for global companies. A global standard reduces technical barriers to trade, lowers product development and manufacturing costs, and simplifies planning and management.

Consequently, as an example, the preponderance of X3 domestic standards is now being developed concurrently with the international counterpart committee, JTC 1, which sets information technology standards for the ISO and the IEC. Similar linkages occur between other U.S. IT standards developing bodies and their international counterparts.

Information Infrastructure Standards Panel (IISP)

Industry recognized last year that concerted action was needed to promote, accelerate and coordinate the timely development of required information infrastructure standards within the national and international voluntary standards system.

As a result, ITI took the lead in working with ANSI, to establish the Information Infrastructure Standards Panel (IISP), a group that represents a broad cross section of standards developing organizations, corporations and users, including the federal government. Through ITI's continued participation in IISP, we are working to identify gaps in critical interface standards development and to initiate accelerated development and adoption of those necessary to the GII's functionality.

Although we are staunch supporters of, and participants in, the national and international voluntary standards efforts to develop information infrastructure standards, we do recognize that there are standards issues that require government attention and intervention, and we would encourage the members of this Subcommittee to, when the need arises, support industry's interests in these matters.

These issues involve the use of standards as barriers to trade, and the treatment of intellectual property rights in standards.

I need only to mention recent efforts by the Japanese to adopt cellular telephone standards that would have excluded all U.S. manufacturers from the Japanese market to illustrate the profound impact that standards can have on international trade. This instance is far from an isolated case, and I urge the Subcommittee to be alert to other instances when such acts can impede the free flow of goods and services so essential to a robust economy and an emerging GII.

Another illustration will show how the rights of U.S. companies can be jeopardized in the standards process. ETSI, the European Telecommunications Standards Institute, recently adopted an intellectual property rights policy that would have, had it been implemented, excluded companies from participating in Europe's telecommunications market if they refused to agree to compulsory licensing of their intellectual property used in ETSI standards, and other onerous requirements. Fortunately, thanks to ITI and our government working together, this policy was not adopted. But again, it illustrates how standards policies can skew the marketplace to the detriment of competition and free trade.

Conclusion

The purpose of this hearing was to explore ways that the government can serve as an enabler of GII development. "Enabler" is an appropriate word. As we stated in the ITI/EUROBIT/JEIDA GII paper, "The information technology industry believes that the private sector—the providers of the information technology products and services—will drive the development of the GII."

The GII will be market driven and user driven. Users will be able to choose from a vast array of products and services that will have personal, business, educational and professional applications. While none of us can predict which of those products and services will be the "winners" and which will be the "losers," we do agree that market forces will sort them out.

What the government can best do, then, is to ensure that competition can thrive and that users will have the choices they deserve as the GII evolves. Therefore, to quote again from our paper, ITI believes that "governments around the world can most effectively advance this development by primarily working toward increasing access to markets for critical GII products and services."

We appreciate the continued interest of the Subcommittee in this issue. We look forward to working with the Congress and the Administration to stimulate the development of the GII. Thank you Mr. Chairman.

STATEMENT BY
RALPH HARNETT, SENIOR VICE PRESIDENT, RAYCHEM CORPORATION
ON BEHALF OF
THE AMERICAN ELECTRONICS ASSOCIATION

SUMMARY

✓ The promise of GII will remain unrealized unless we have full and effective market access in all countries. Without market access, the opportunities of the information society are severely restricted and the benefits offered by the technology will not accrue to countries that have not fully opened their markets to competition.

✓ By providing its domestic industry a sheltered home market, a foreign government effectively closes opportunities for workers and companies, limits uses of technology and severely hinders its own economy as well as global economic growth.

✓ The following principles must be adhered to if we are to achieve full and effective market access: (1) open and transparent systems for standards setting; (2) open and transparent procurement systems; (3) fair and open competition; (4) elimination of tariff and non-tariff barriers; and (5) intellectual property protection and enforcement.

Prior to the G-7 summit, AEA recommended to the U.S. that the G-7 accomplish three things:

✓ **Highlight the benefits that can accrue to all citizens through the deployment of a Global Information Infrastructure.**

***Outcome*:** **Good** -- The demonstrations projects and the high-level attendance helped highlight the opportunities and enhancements that can improve the quality of all our lives. There is more to be done, but the applications projects will bring the benefits into focus. Further, the G-7 leaders agreed to report on the status, with the goal of having the applications launched by the G-7 Halifax Summit this summer.

✓ **Emphasize that private investment in, deployment of and usage of GII will be severely restricted without open markets and robust competition in these markets.**

Outcome: **Good** -- The business leaders discussion at the Roundtable demonstrated the importance industry places on open markets and competition. Further, Vice President Gore's speech clearly established the foundation for full and open market access. And finally, the G-7 leaders committed to "[o]pen up markets to all the development of global systems. This is to be accomplished by pursuing liberalisation of services, infrastructure, equipment and investment, within an appropriate framework. Special emphasis should be given to the negotiation in the WTO, notably on such sectors as basic telecommunications, which are important to see concluded successfully by April 1996." This commitment must now be followed with specific and aggressive action if we are to achieve results by April 1996.

✓ **Commit to specific actions and establish deadlines.**

Outcome: **Mixed** -- While industry is extremely pleased with the G-7 leaders commitment to open markets, renewed focus and commitment to the GATS and its deadline. However, the Communique is quite limited on specific actions that must be undertaken to achieve open markets and liberalization. Further, the communique does not commit the leaders to liberalization, but only commits to "pursuing" liberalization -- and we all know that pursuing and achieving are two distinctly different things. The commitment must be to liberalization not to its pursuit. Unlike happiness, liberalization has tangible components that can in fact be achieved and documented.

✓ The Administration and Congress, working in close partnership with industry, should establish clear objectives through bilateral and multilateral negotiations to remove market barriers to the deployment of GII.

✓ One of the principle barriers to market access in telecommunications and information services is market structure -- most nations have monopoly telecommunications operators. Further, the regulation of telecommunications is carried out by these same monopoly operators and the result is that any entry is at the expense of the primary competitor. The monopolist sets the terms and conditions of service provision and of interconnection -- the ability to use the public network. Even where the monopoly structure has been formally abandoned in favor of competition, the incumbent operator's market power constitutes an enormous barrier to successful competition.

✓ Consequently, in addition to other bilateral and multilateral negotiations, it is essential that we reach a successful conclusion to the GATS negotiation. A successful regime must enforce the following basic principles in order to successfully establish competition:
  ✓ **Competition rather than monopolies**
  ✓ **Separate and effective regulation**
  ✓ **Transparent and non-discriminatory interconnect regime**
  ✓ **Cost-based interconnection**
  ✓ **Open and transparent regulatory process**

✓ The G-7 leaders must commit to these specific actions in Halifax to ensure that their commitment to open markets, dynamic competition, and liberalized equipment, service and infrastructure markets is realized.

Mr. Chairman and members of the Subcommittee, AEA appreciates the opportunity to present our views on the Global Information Infrastructure and the recently concluded G-7 Summit on the Information Society. We commend you and the Subcommittee for holding this timely hearing and look forward to working with you and the 104th Congress to facilitate the rapid deployment of GII.

I am testifying this afternoon on behalf of the American Electronics Association (AEA), which represents some 3,000 U.S. technology companies. The electronics industry employs over 2.4 million Americans and accounts for over $393 billion in worldwide sales. Our companies are located in 44 states that span the breadth of the electronics industry from silicon to software, to all levels of computers, communications networks, and systems integration. AEA represents U.S. companies globally through our offices in Brussels and Tokyo and, soon through our office in Beijing.

Raychem is a Fortune 500 company with over $1 billion in revenue, of which over 60% is generated from international sales. Raychem's telecommunications division provides a wide variety of products, including connectors, multiplexers, and fiber-optics technology for the global communications marketplace.

What is GII and Why is it important?

Fundamentally, GII is about putting technology to work to improve the quality of our lives, to increase our competitiveness and to expand our economic opportunities. As we discuss and demonstrate the applications of information technology, the enthusiasm for a Global Information Infrastructure grows exponentially. With the deployment of GII, we will have access to the best, most timely information and experts in areas such as health, education, environment and crime control.

Imagine a world where proximity to a major city or university is not required to ensure that you have access to the best medical advice and treatment or where movement of hazardous materials can be monitored and spills and other environmental crises can be controlled and clean-up and rescue efforts can begin immediately rather than wasting precious hours flying experts into the damaged area. This is part of what a Global Information Infrastructure offers.

The GII has become a convenient label for referring to the expanding web of communications -- often called a network of networks -- that is evolving worldwide. GII implies a globally distributed, interconnected and interoperable information platform of products and services capable of transmitting, storing, processing and displaying voice, data and images. It is based on multiple computer and telecommunications technologies, wired and wireless, narrowband and broadband, and is reliant on rapid advances in semiconductor technology -- faster, smaller and cheaper processing capability -- for continued growth. All focused on the customer -- individuals, corporations and governments.

In an AEA-commissioned industry survey on the importance and benefits of the Global Information Infrastructure, industry's assessment is that the GII will generate innovation that will spawn new industries, encourage entrepreneurial companies and create jobs. I'd like to highlight some of our findings that set the stage for several key issues, specifically the benefits of the GII, the importance of global market access, the important role of the private sector and the role of the government.

When asked what portion of society would benefit, we found that:

- ✓ 9 out of 10 executives believe NII/GII will prove very beneficial to education.
- ✓ 66% expect NII/GII to be very beneficial to health care.
- ✓ 8 out of ten believe NII/GII as beneficial to government services such as defense and law enforcement.
- ✓ More than 70% say that the information superhighway will increase the global competitiveness of the U.S. electronics industry.
- ✓ And, more than 85% say that the competitiveness of the U.S. economy as a whole will benefit.

When asked about the role of the government:

- ✓ 92% say government should eliminate jurisdictional and legal obstacles to the GII.
- ✓ 82% say that government regulations have been serious obstacles to the GII.
- ✓ 73% say lack of standards are serious obstacles.
- ✓ More than 55% say the rate of regulatory reform is crucial to creating a national information superhighway.
- ✓ 70% say the government should support patent and copyright protection.
- ✓ 65% say that the government should not invest in actual network deployment.

Having provided some context about industry's views of GII, let me turn to three specific issues before concluding with an assessment of the G-7 Summit. These issues are: Market Access, which is AEA's primary focus for the GII; Privacy; Export Controls; and Universal Service and Access.

Market Access

The promise of GII will remain unrealized unless we have full and effective market access in all countries. Market access is the foundation on which GII must be built. Without market access, the opportunities of the information society are severely restricted and the benefits offered by the technology will not accrue to countries that have not fully opened their markets to competition. Fundamentally, it is in the interest of other nations to open their doors to the products and services of GII regardless of origin. Governments that deny their industries and citizens from experiencing the social benefit of the GII should be held accountable for consigning their economies to a second rate status.

AEA's definition of market access is quite broad, it means access at all levels for all competitors. This includes access in equipment, services and infrastructure. Issues that are directly related to market access include tariffs, non-tariff barriers such as weak or ineffective intellectual property protection, discriminatory procurement practices, non-transparent standards process, competition policy, frequency allocation and export controls. We will not cover all of these today, but have submitted with our testimony for the record a short paper that details the role of these issues in market access.

In testimony before the Administration's Information Infrastructure Task Force, in July 1994, AEA called for an aggressive market access component of GII. We set out the following set of principles necessary to move the GII forward. We have communicated these principles to the Administration and to European leaders through our office in Brussels. We will continue to work with our companies and our counterparts throughout the world to advance the principles and to facilitate the deployment of GII.

Global Market Access: Principles

Trade barriers and structural impediments in foreign markets are destructive to the global economy. By providing its domestic industry a sheltered home market, a foreign government effectively closes opportunities for workers and companies, limits uses of technology and severely hinders its own and global economic growth. Global leadership in the information industry can be best maintained and enhanced by ensuring that there is equivalent access in all markets for technology, products and services.

Because of this, global leadership is critical to ensure full and effective market access as we proceed in the development and deployment of the GII. Just as the principles of open, competitive markets have been developed and followed in multilateral talks, we must maintain these principles and expand upon them in the Global Information Infrastructure. In fact, we must insist that our respective governments redouble their efforts to ensure open market principles and treatment for information technology by closely monitoring existing bilateral and multilateral agreements and negotiate additional accords where necessary. Partnership with industry in identifying real or potential trouble is critical.

There are basic principles for market access which provide a solid foundation for the GII. These are:

- **open and transparent systems for standards setting** -- Any country involved in the GII, should have a standards-setting process that is open and voluntary, offering non-discriminatory access to all standards-setting bodies. The standard-setting process should seek to protect intellectual property rights and ensure non-discriminatory access to standards and government-supported technology on reasonable terms. The goal of the process should be standards that lead to the development of interoperable products offered in a competitive market.

- **open and transparent procurement systems** -- Governments are significant customers in the development of information infrastructures. Consequently, we must ensure that procurement, both public and private, for the Global Information Infrastructure is conducted in each participating country in a open and transparent manner, including non-discriminatory access to all phases of planning and procurement and including standards and specifications development. There must be clear and weighted selection criteria and advance notice. Without transparency, there cannot be competition and without competition, the result may be discriminatory purchasing patterns that are not market-driven.

- **fair and open competition** -- Our industry is engaged in fierce global competition. We have learned that if a major competitor is able to operate from a closed home market, the very survival of important segments of our industry can be threatened. Consequently, we must ensure that all countries involved in the GII accept and act on the principle of competition.

- **elimination of all tariff and non-tariff barriers to market access** -- Given the complex nature of the Global Information Infrastructure, there will need to be bilateral and multilateral negotiations to eliminate significant tariff and non-tariff barriers such as export controls, discriminatory purchasing practices, certification procedures, and investment restrictions. With respect to tariffs, AEA has historically advocated for and remains committed to the achievement of zero tariffs for trade among developed countries for all electronics products.

- **intellectual property protection and enforcement --** Without adequate intellectual property protection, companies are denied a critical competitive advantage necessary to market products and services, that is an exclusive and enforceable right to their own innovative technology. Consequently, effective laws must be in place and these laws must be enforced to ensure protection of companies' intellectual property rights. While AEA is and has been a strong advocate for global harmonization and the GATT TRIPs agreement on intellectual property, we must caution that the phase-in period for the developing countries is at least a decade. Furthermore, some important countries are not yet members of the WTO.

Privacy and Confidentiality

One key area that must be addressed if the full benefit of GII is to be realized is privacy and confidentiality. For example, I mentioned earlier the opportunity of not having to be physically near a major medical facility to have access to the best health care. Through the technology -- data, voice and image storage and transmission -- , a patient in a remote part of the world will have access to a cancer specialist at NIH or Sloan Kettering. But without adequate protection on sensitive and confidential patient information that will be stored and transmitted using the GII, uses for GII will be limited. There are numerous news articles about hackers who access confidential information. Again, without some ability to protect this information, people will be unwilling to fully use the GII to increase productivity. Encryption is the one tool that is available to protect the owners of this data and information. It is essential to the confidentiality and integrity of the data. Lacking this, the GII will lack the safeguards on privacy that are essential for the protection of businesses and consumers. While AEA recognizes the legitimate needs of governments to enforce the law and maintain national security, we believe that the privacy and trust for individuals and businesses must be addressed. This will require that a solution be found and that products with this technology be exportable, specifically for legitimate business end-users.

Today, however, even mass-market encrypted products such as Lotus Notes, Norton Antivirus, and other essential business tools, are under strict export licensing requirements because they contain encryption algorithms that the U.S. State Department considers a "munition" or weapon. The biggest impediment to rational treatment of encryption exports is the fact that the State Department treats these exports exactly the same way it treats exports of F16 fighter aircraft -- with multiple review levels, referral to a large number of bureaucratic entities within State Department, and time lines that are not appropriate to products that have life cycles measured in months rather than years.

In fact, Mr. Chairman, if I want to install this antivirus software in my company worldwide, I can't do it today. While my domestic offices can have access now, I would be required to get a license and withhold this important tool from offices outside the U.S. As the global information highway develops, data security and privacy will be of paramount importance to customers both in the U.S. and abroad. Software and hardware products embedded with encryption capabilities now represent a standard information technology feature intended to meet those security needs.

Export Controls

While securing open markets, the U.S. government must also ensure that it does not unnecessarily impede its industry from exporting its products and services. To succeed in fostering efficient, high-speed global communication with universal access, the global information infrastructure requires the best technological building blocks, including computers, telecommunications, semiconductors and software. These sectors are in fact the essence of information technology. The U.S. is the world leader in the design and production of information technology and is poised to be the world's leading supplier of the building blocks of the GII.

The U.S. is not without challenge. To meet that challenge, the U.S. must:
- be first to market with new product innovations;
- meet customer needs promptly; and
- maintain its leadership in setting the industry standard for component and system architecture.

The challenge is coming from companies abroad, seeking greater market access and acceptance of non-U.S. products. And, the challenge has come from the U.S. government, with a system of export controls that undermines the imperatives of a successful high tech industry. Currently, the export controls system acts as a market access disincentive. Further, these controls can impede the deployment of a Global Information Infrastructure.

Dizzying advances in the performance and global dispersion of sophisticated information technology over the past 3-5 years has made export controls a futile exercise, and indeed, an unnecessary one. For several reasons, it is no longer in the national interest to attempt to control civilian information technology:

- The principal threats to U.S. security now stem from regional conflicts and "rogue" regimes seeking to acquire weapons of mass destruction. Information technology does not make an essential contribution to these threats.

- The thrust of modern information technology -- miniaturization, modularity, and distributed networks -- runs counter to effective controls. The character and hence the challenge for control of today's information technology is far different than in past decades -- now symbolized by billions of inexpensive microchips running computers that double in speed every six to twelve months.

- Commercial licensing of technology and global manufacturing capabilities are market imperatives that have contributed to an exceptionally wide diffusion of information technology. With widespread foreign availability, export controls are ineffective.

- Export controls have a disproportionate impact on U.S. industry. The stringent, extraterritorial application of U.S. controls in contrast to the generally modest application of controls by other countries poses a financial burden for U.S. industry and disincentives to purchase U.S. products.

In our view, the best way to build on the momentum of the Administration's September 1993 and March 1994 initiative to liberalize controls on computers and telecommunications products, is to codify the very process by which they made the decision.

AEA tried this last year with an amendment to the export control reform bill -- H.R. 4663 -- that you cosponsored, Mr. Chairman, with then-chairman Gejdenson. Our amendment, sponsored at the time by Representatives Don Edwards and Chris Cox and now appearing in your Export Administration Act reauthorization bill, H.R. 361, improves that process by making it applicable to all dual-use technology that is controlled according to performance measurements.

The amendment requires an annual review of export controls on dual-use technology. The annual review must consider: 1) the objectives of such controls (that is, what were they designed to accomplish and why specific product performance levels designated in the control were considered the "threat level"), and the extent to which such objectives have been met; 2) the extent to which the products controlled are widely available -- or will be before the next annual review -- from sources outside the United States; and 3) the economic impact on U.S. industry of such controls.

Based on this review, the Secretary of Commerce would be required to increase the performance levels at which technologies are controlled or otherwise modify controls in accordance with the findings. The amendment includes a general default provision that requires the Secretary to propose multilateral decontrol of all dual-use goods that reach "mass-market" status of 100,000 units installed for end-use outside of the United States over a 12-month period. Again, Mr. Chairman, this amendment would apply to all the tools of the GII, including computers and computer networking equipment, semiconductors, telecommunications and software.

Universal Service and Access

There is some concern that the governments may mandate services and access, without regard for the market place. Further, there is concern that such mandates may lead to government regulation of previously unregulated industries.

To be consistent with a commitment to open markets and competition, AEA believes that the market will provide for universal access (the ability to access some form of network services) and service. As far as a new definition of universal service applying to GII, we do not believe that governments should (or can) mandate what these services might entail -- the market will do so.

AEA believes in the following four principles to achieve the goals of universal access and universal service to all regardless of their location or economic status. Adherence to these principles will significantly improve the environment in which the private sector must operate to fully develop the NII and GII.

1. **An efficient market and robust competition will achieve universal access and service goals.** Robust competition--not regulation--will provide the best information services at the lowest price to the most people in a deregulated marketplace. The current system of universal service regulation and subsidy allocation was designed during an era of monopoly telephone services. The preferred way to level the playing field for converging technologies, all fighting for leadership and acceptance in the market, is to allow previously regulated information services to compete head-on with previously unregulated

technologies. Competition, not regulation or subsidy, will determine the winners and losers in the open market and insure that innovation is properly rewarded with market acceptance.

2. **Market forces will define and provide for universal service and access.** Markets--individuals making choices about quality and price--will define what information services should be universal. Changes to the formal or legal definition of universal services are premature.

3. **Government -- including state and local -- has a limited role to play.** Government has an important but limited role to ensure efficient markets, promoting competition and identifying the failure of free markets to provide necessary services to individuals or institutions. Attempts by government officials in the United States, Europe, or elsewhere to second-guess the needs and choices of individual or institutional consumers related to universal access and service will tend to retard innovation, obstruct private sector deployment of the NII and GII, and reduce the efficiencies and benefits of free markets.

4. **Subsidies are a last resort and should be provided directly to individuals or institutions that need them, but only if market forces fail.** As a last resort, they should be used only when there is clear market failure. When necessary, subsidies should be direct and carefully targeted. Any advantages gained through subsidization will eventually cause companies to be less driven to provide innovation and quality.

G-7 Summit and Its Outcome

AEA would like to commend the G-7 leaders for focusing the recent meeting in Brussels on such an important issue. We would especially like to acknowledge President Clinton and Vice President Gore for their vision on both the NII and GII. These initiatives to create and deploy a Global Information Infrastructure will result in economic growth, job creation and significant improvement in the quality of our lives.

Prior to the G-7 summit, AEA recommended to the U.S. that the G-7 accomplish three things:

✓ **Highlight the benefits that can accrue to all citizens through the deployment of a Global Information Infrastructure.**

Outcome: **Good** -- The demonstrations projects and the high-level attendance helped highlight the opportunities and enhancements that can improve the quality of all our lives. There is more to be done, but the applications projects will bring the benefits into focus. Further, the G-7 leaders agreed to report on the status, with the goal of having the applications launched by the G-7 Halifax Summit this summer.

✓ **Emphasize that private investment in, deployment of and usage of GII will be severely restricted without open markets and robust competition in these markets.**

Outcome: **Good** -- The business leaders discussion at the Roundtable demonstrated the importance industry places on open markets and competition. Further, Vice President Gore's speech clearly established the foundation for full and open market access. And finally, the G-7 leaders committed to "[o]pen up markets to all the development of global systems. This is to be accomplished by pursuing liberalisation of services, infrastructure, equipment and investment, within an appropriate framework. Special emphasis should be given to the negotiation in the WTO, notably on such sectors as basic telecommunications, which are important to see concluded successfully by April 1996." This commitment must now be followed with specific and aggressive action if we are to achieve results by April 1996.

✓ **Commit to specific actions and establish deadlines.**

Outcome: **Mixed** -- Industry is extremely pleased with the G-7 leaders commitment to open markets, renewed focus and commitment to the GATS and its April 1996 deadline. However, the Communique is quite limited on specific actions that must be undertaken to achieve open markets and liberalization. Further, the communique does not commit the leaders to liberalization, but only commits to "pursuing" liberalization -- and we all know that pursuing and achieving are two distinctly different things. The commitment must be to liberalization not to its pursuit. Unlike happiness, liberalization has tangible components that can in fact be achieved and documented.

Next Steps
The Administration and Congress, working in close partnership with industry, should establish clear objectives through bilateral and multilateral negotiations to remove market barriers to the deployment of GII.

One of the principle barriers to market access in telecommunications and information services is market structure -- most nations have monopoly telecommunications operators. Further, the regulation of telecommunications is carried out by these same monopoly operators and the result is that any entry is at the expense of the primary competitor. The monopolist sets the terms and conditions of service provision and of interconnection -- the ability to use the public network. Even where the monopoly structure has been formally abandoned in favor of competition, the incumbent operator's market power constitutes an enormous barrier to successful competition.

Consequently, a GATS regime must enforce the following basic principles in order to successfully establish competition:

✓ **Competition rather than monopolies** -- Liberalization will not occur until state-owned/state-supported monopolies are eliminated.

- ✓ **Separate and effective regulation** -- The authority for regulating should be separate from the infrastructure provider. Regulatory oversight must ensure that conditions are equal for all service providers and carriers so that success or failure is a function of market responsiveness not regulatory rules.
- ✓ **Transparent and non-discriminatory interconnect regime** -- Competing providers of services and equipment must have access to the public network transport facilities. Interconnection must be designed to ensure there is parity of prices, reasonable terms and conditions.
- ✓ **Cost-based interconnection** -- Rates for accessing the network and providing services should reflect costs and not be "punitive" so as to make the service cost-prohibitive.
- ✓ **Open and transparent regulatory process** -- Without an open and transparent regulatory process, discrimination can exist. It is important to ensure that all interested and affected parties -- including customers -- are given notice of impending regulatory actions and have the opportunity to comment on the effect of such regulatory actions.

The G-7 leaders must commit to these specific actions in Halifax to ensure that their commitment to open markets, dynamic competition, and liberalized equipment, service and infrastructure markets is realized.

Thank you, Mr. Chairman. I'll be pleased to answer any questions.

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